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# CPH3456



ON Semiconductor®

www.onsemi.com

## Power MOSFET 20V, 71mΩ, 3.5A, Single N-Channel

### Features

- ON-Resistance  $R_{DS(on)1}=54m\Omega$  (typ)
- 1.8V Drive
- Pb-Free, Halogen Free and RoHS Compliance

### Specifications

**Absolute Maximum Ratings** at  $T_a = 25^\circ\text{C}$

Parameter	Symbol	Value	Unit
Drain to Source Voltage	$V_{DSS}$	20	V
Gate to Source Voltage	$V_{GSS}$	$\pm 12$	V
Drain Current (DC)	$I_D$	3.5	A
Drain Current (Pulse) $PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$	$I_{DP}$	14	A
Power Dissipation When mounted on ceramic substrate ( $900\text{mm}^2 \times 0.8\text{mm}$ )	$P_D$	1.0	W
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

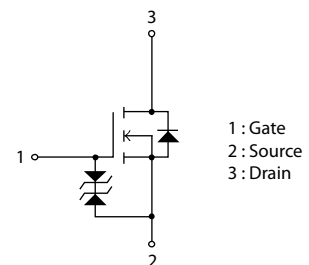
This product is designed to "ESD immunity < 200V\*", so please take care when handling.  
\* Machine Model

### Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Junction to Ambient When mounted on ceramic substrate ( $900\text{mm}^2 \times 0.8\text{mm}$ )	$R_{\theta JA}$	125	$^\circ\text{C/W}$

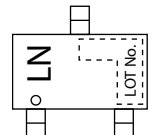
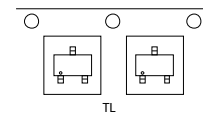
$V_{DSS}$	$R_{DS(on)}$ Max	$I_D$ Max
20V	71 mΩ@4.5V	3.5A
	103 mΩ@2.5V	
	156 mΩ@1.8V	

### Electrical Connection N-Channel



### Packing Type: TL

### Marking



Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

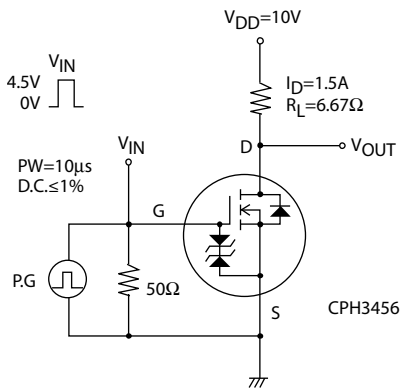
# CPH3456

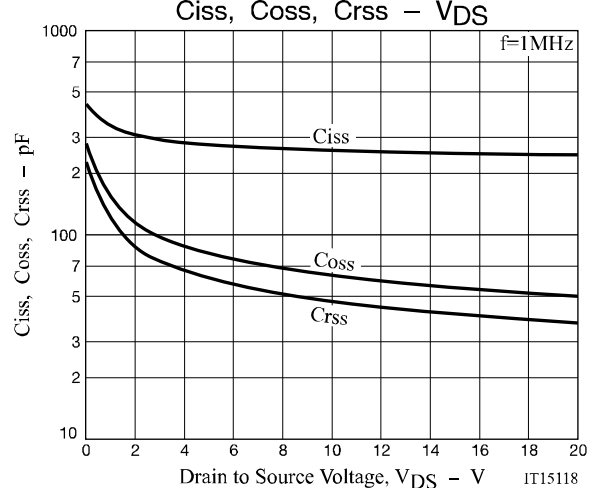
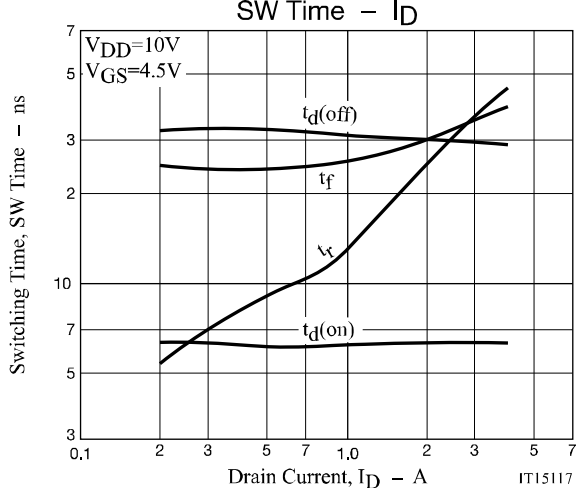
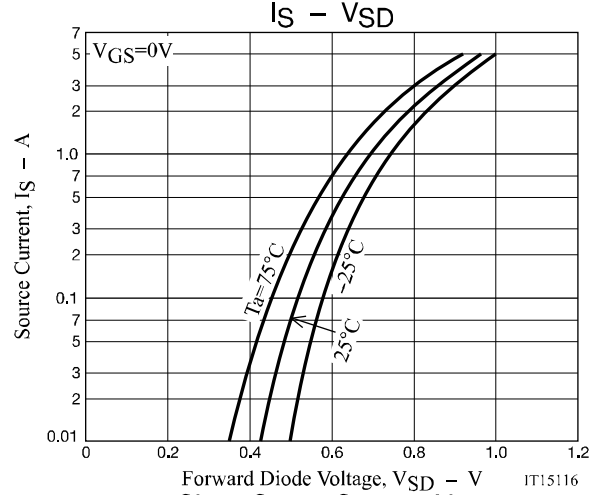
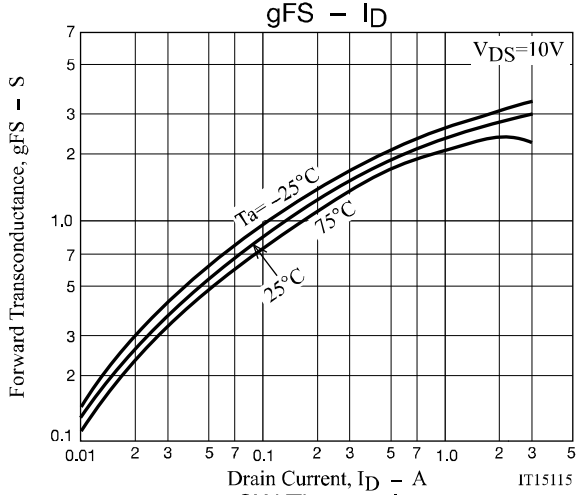
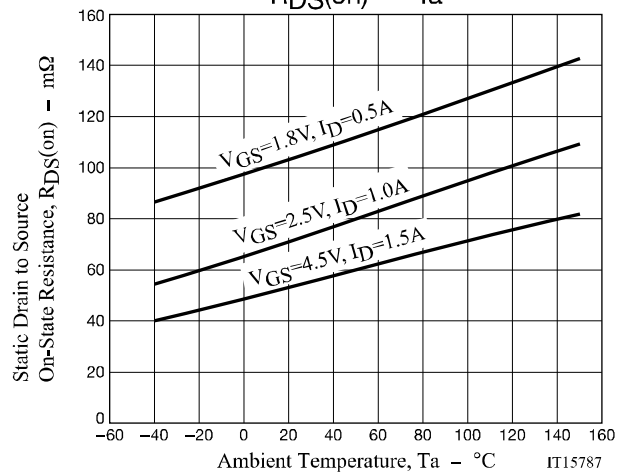
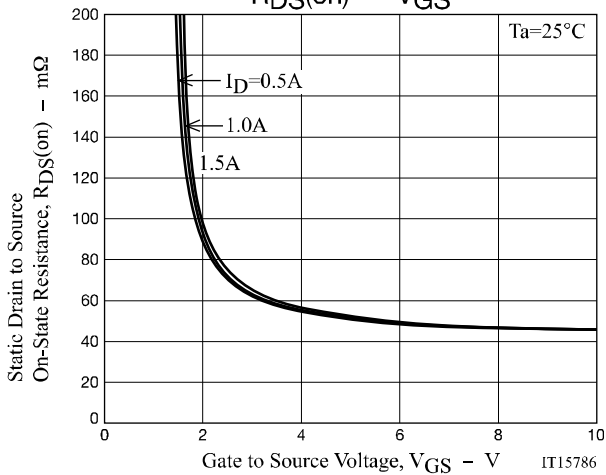
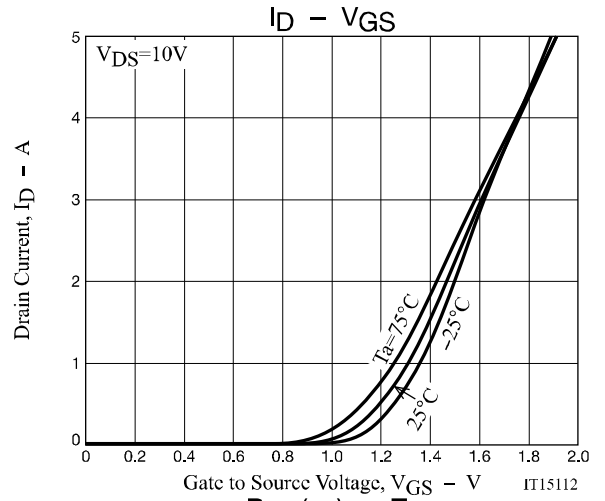
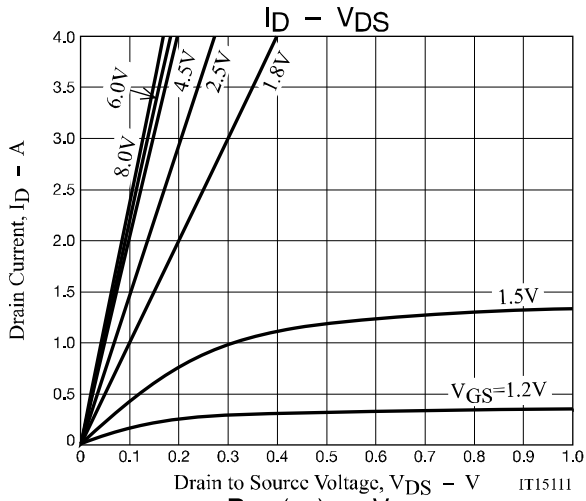
## Electrical Characteristics at $T_a = 25^\circ\text{C}$

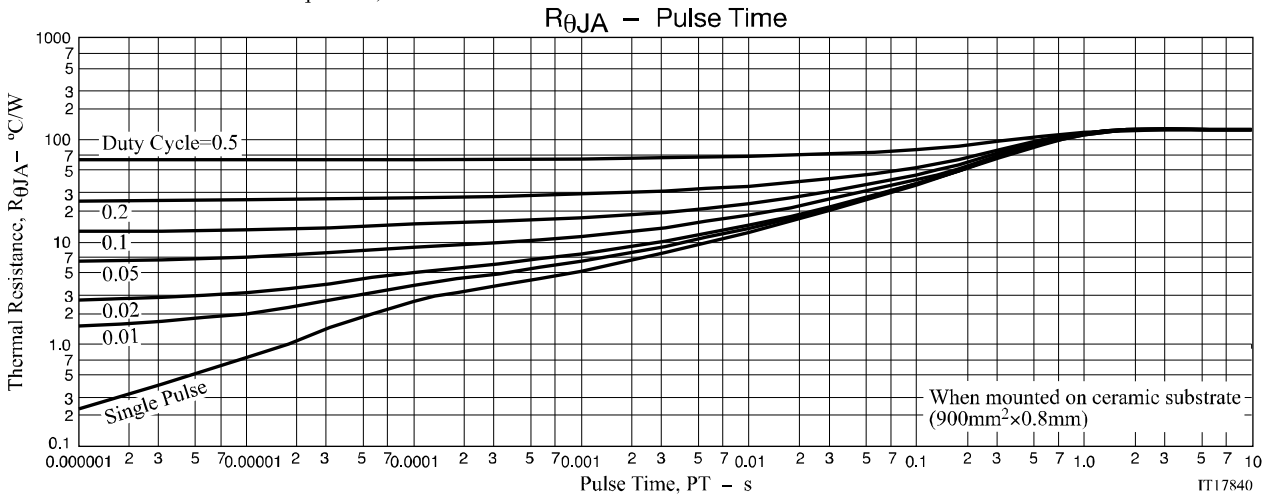
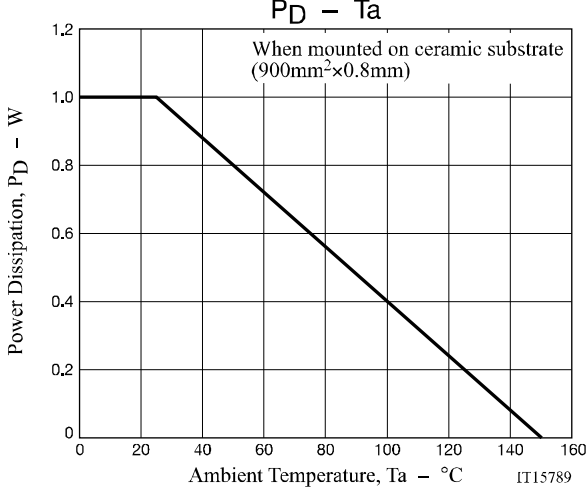
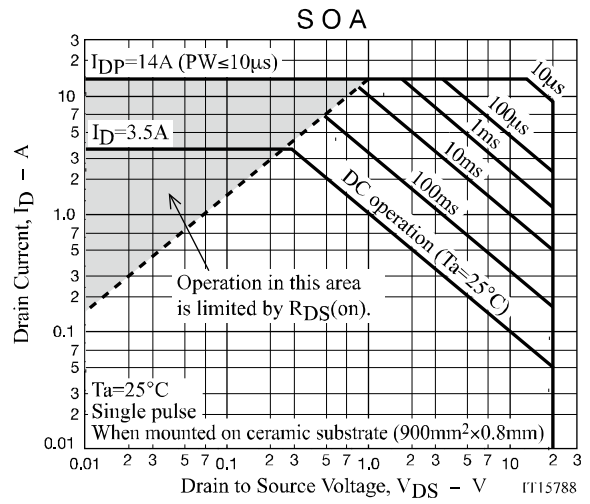
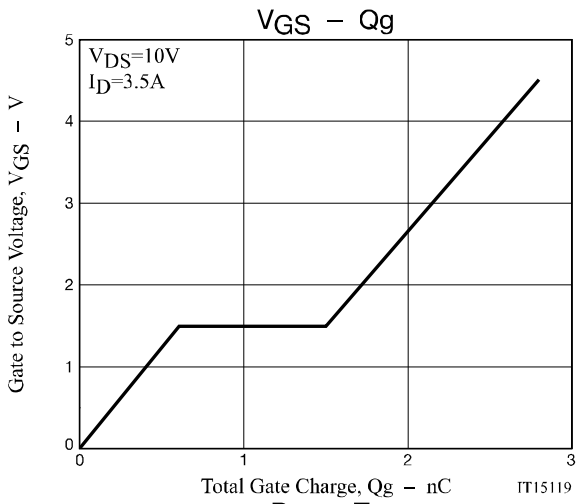
Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=1\text{mA}, V_{GS}=0\text{V}$	20			V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20\text{V}, V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 8\text{V}, V_{DS}=0\text{V}$			$\pm 10$	$\mu\text{A}$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=10\text{V}, I_D=1\text{mA}$	0.4		1.3	V
Forward Transconductance	$g_{FS}$	$V_{DS}=10\text{V}, I_D=1.5\text{A}$		2.8		S
Static Drain to Source On-State Resistance	$R_{DS(on)1}$	$I_D=1.5\text{A}, V_{GS}=4.5\text{V}$		54	71	$\text{m}\Omega$
	$R_{DS(on)2}$	$I_D=1\text{A}, V_{GS}=2.5\text{V}$		73	103	$\text{m}\Omega$
	$R_{DS(on)3}$	$I_D=0.5\text{A}, V_{GS}=1.8\text{V}$		104	156	$\text{m}\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=10\text{V}, f=1\text{MHz}$		260		pF
Output Capacitance	$C_{oss}$			65		pF
Reverse Transfer Capacitance	$C_{rss}$			50		pF
Turn-ON Delay Time	$t_{d(on)}$			6.2		ns
Rise Time	$t_r$	See specified Test Circuit		19		ns
Turn-OFF Delay Time	$t_{d(off)}$			30		ns
Fall Time	$t_f$			28		ns
Total Gate Charge	$Q_g$	$V_{DS}=10\text{V}, V_{GS}=4.5\text{V}, I_D=3.5\text{A}$		2.8		nC
Gate to Source Charge	$Q_{gs}$			0.6		nC
Gate to Drain "Miller" Charge	$Q_{gd}$			0.9		nC
Forward Diode Voltage	$V_{SD}$		$I_S=3.5\text{A}, V_{GS}=0\text{V}$		0.85	1.2

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## Switching Time Test Circuit







# CPH3456

## Package Dimensions

CPH3456-TL-H/ CPH3456-TL-W

### CPH3

CASE 318BA

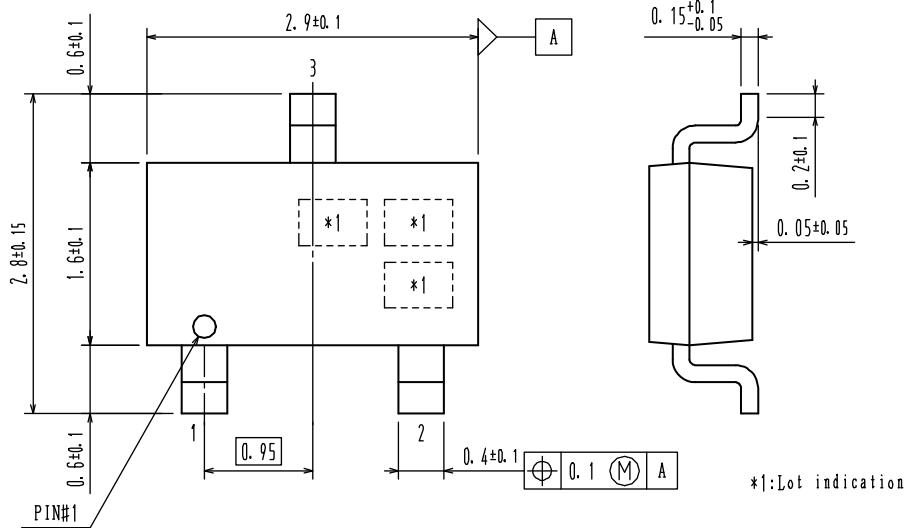
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Unit : mm

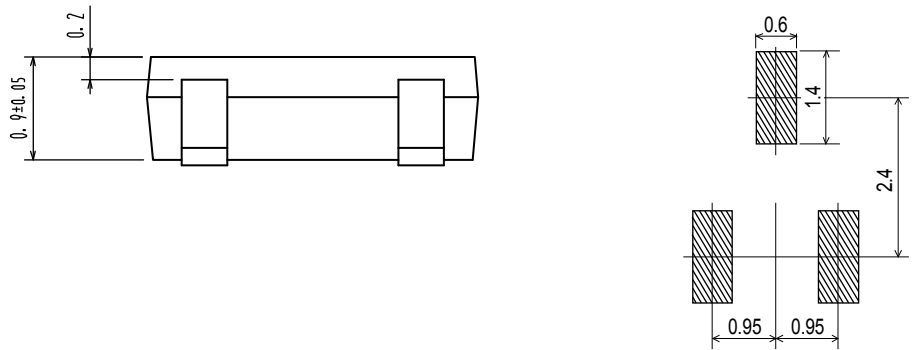
1 : Gate

2 : Source

3 : Drain



## Recommended Soldering Footprint



## ORDERING INFORMATION

Device	Package	Shipping	Note
CPH3456-TL-H	CPH3, SC-59	3,000	Pb-Free
CPH3456-TL-W	SOT-23, TO-236	pcs. / reel	and Halogen Free

Note on usage : Since the CPH3456 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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